



 United States  
Department of  
Agriculture

Soil  
Conservation  
Service

Spokane,  
Washington



# Washington Water Supply Outlook

January 1, 1987



# Foreword

## How Forecasts Are Made

Most of the annual streamflow in the Western United States originates as snowfall. This snowfall accumulates high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are viewed in conjunction with snowpack data to prepare runoff forecasts. This report presents a comprehensive picture of water supply outlook conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data and narratives describing current conditions.

Streamflow forecasts are cooperatively generated by Soil Conservation Service and National Weather Service hydrologists. Forecasts become more accurate as more data affecting runoff becomes known. For this reason, forecasts are issued that reflect three future precipitation conditions — Below Normal, Average, and Above Normal. These forecasts are termed reasonable minimum, most probable, and reasonable maximum. Actual streamflow can be expected to fall between the lower and upper forecast values eight out of ten years.

Snowpack data are obtained by using a combination of manual and automated measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation, temperature, and other parameters are monitored on a daily basis and transmitted via radio telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

## For More Information

Copies of Monthly Water Supply Outlook Reports and other reports may be obtained from the states listed below. Because of the limited space, snow survey measurements are not published in monthly reports. An annual snow survey data summary is published by the Soil Conservation Service for each of the western states. Historical snow survey data may be obtained at those same offices.

STATE	ADDRESS
Alaska	201 East 9th Ave., Suite 300, Anchorage, AK 99501-3687
Arizona	201 East Indianola, Suite 200, Phoenix, AZ 85012
Colorado	2490 West 26th Ave., Denver, CO 80211
New Mexico	517 Gold Ave. S.W., Room 3301, Albuquerque, NM 97102
Idaho	304 North 8th Street, Room 345, Boise, ID 83702
Montana	10 East Babcock, Room 443, Federal Building, Bozeman, MT 59715
Nevada	1201 Terminal Way, Room 219, Reno, NV 89502
Oregon	1220 Southwest 3rd Ave., Room 1640, Portland, OR 97208
Utah	4402 Federal Building, 125 South State Street, Salt Lake City, UT 84147
Washington	360 U.S. Court House, Spokane, WA 99201
Wyoming	Federal Building, 100 East "B" Street, Casper, WY 82601

In addition to state reports, a Water Supply Outlook for the Western United States is published by the Soil Conservation Service and National Weather Service monthly, January through May. Reports may be obtained from the Soil Conservation Service, West National Technical Center, 511 Northwest Broadway, Room 547, Portland, OR 97209.

Published by other agencies:

Water Supply Outlook Reports prepared by other agencies include: California — Snow Survey Branch, California Department of Water Resources, P.O. Box 388, Sacramento, CA 95802; British Columbia — The Ministry of Environment, Water Investigations Branch, Parliament Buildings, Victoria, British Columbia, V8V 1X5; Yukon Territory — Department of Indian and Northern Affairs, Northern Operations Branch, 200 Range Road, Whitehorse, Yukon Territory, Y1A 3V1; Alberta, Environment Technical Services Division, 9820 106th St., Edmonton, Alberta T5K 2J6.

# **Washington Water Supply Outlook**

**and**

**Federal — State — Private  
Cooperative Snow Surveys**

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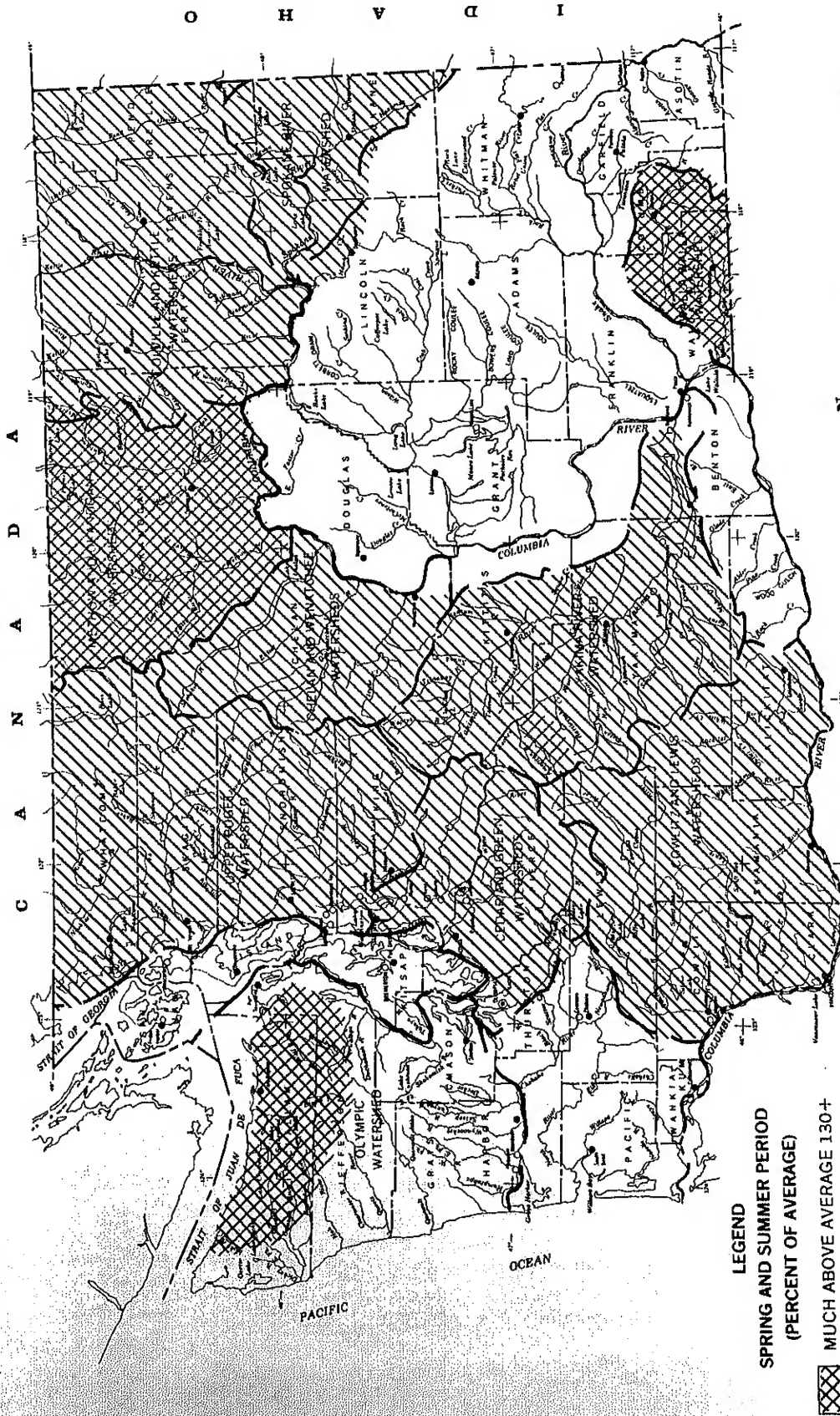
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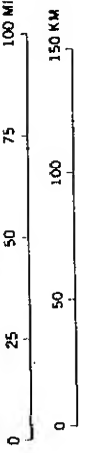
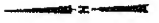
**LEGEND**  
**SPRING AND SUMMER PERIOD**  
**(PERCENT OF AVERAGE)**

- MUCH ABOVE AVERAGE 130+
- ABOVE AVERAGE 110-130
- NEAR AVERAGE 90-110
- BELOW AVERAGE 70-90
- MUCH BELOW AVERAGE 70+ LESS
- NOT FORECAST
- WATERSHED BOUNDARY

January 1, 1987

# STREAMFLOW PROSPECTS

## WASHINGTON



## GENERAL OUTLOOK

### SUMMARY:

Washington water supply forecasts are for below normal runoff for 1987. Snow cover and Precipitation are below average continuing a trend set last year. Reservoir storage is below normal at the major irrigation projects throughout the state. Streamflows have been below the norm for late summer and fall months.

NOTE: Included in this years reports is the snow survey data.

### SNOWPACK:

Very few manual snow measurements were scheduled and made for the January 1 period. Forecasters must rely on SNOTEL data for snowpack information. The January 1 statewide average is 73%. Storms during early January have made improvements to the snowpack. All Washington SNOTEL Sites are reporting snowpack, with Lyman Lake at 5900 feet in elevation having the largest with 27.1 inches of water content. The Columbia River Basin has a snowpack 63% of normal.

### PRECIPITATION:

Precipitation values from SNOTEL sites indicate a water year value near 85% of average for the high mountain areas. Precipitation data from the National weather service sites, located mostly in lower valley areas, show values around the state vary from 35% in the Spokane Basin to 82% of normal for the Olympic Basin. Storms, the first week in January, have deposited over 5 inches at many sites along the Cascade Mountain range.

#### RESERVOIRS:

Reservoir storage is below average in Washington. Major irrigation reservoirs were drawn low the preceding summer when water supplies were also below normal. The Yakima Basin, which relies heavily upon stored water for irrigation, is at 58% of average. Columbia River reservoirs are near normal while storage in the Okanogan area is at 57% of capacity. Power reservoirs, such as Coeur d' Alene at 65% and Chelan Lake at 96% of normal, are suffering from low flows of last fall.

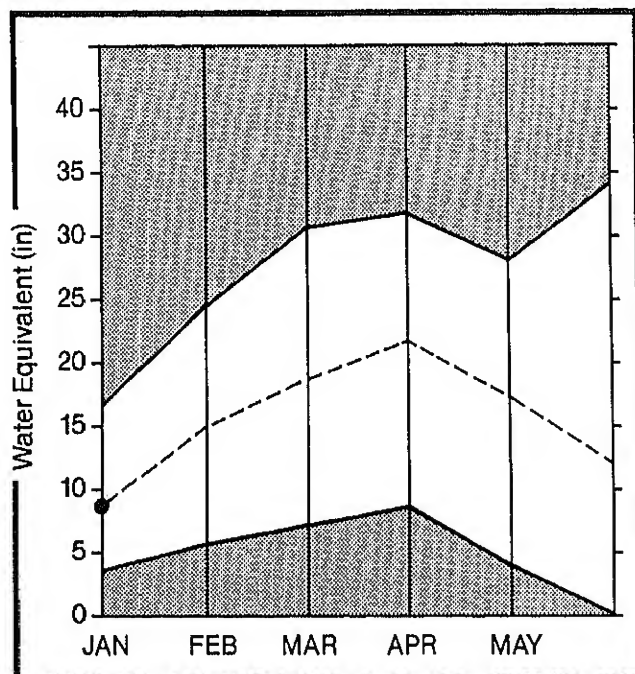
#### STREAMFLOW:

Streamflows are forecasted to be below normal for the coming spring and summer. Snowpack and water year to date precipitation values are below average over most of Washington. Forecasts vary from 72% in the Similkameen River to 93% in the Bumping River. December streamflows continued the summer and fall trend of below normal with only the Okanogan River at 101% being above average. Other December streamflows are; Spokane at Long Lake 76%, Pend Oreille River 75%, Columbia River at the International Boundary 86%, Chelan 65%, Snake 93%, Skagit 63%, and the Chehalis River 50%.



# SPOKANE

Mountain snowpack\* (inches)



\*Based on selected stations

Maximum



Average



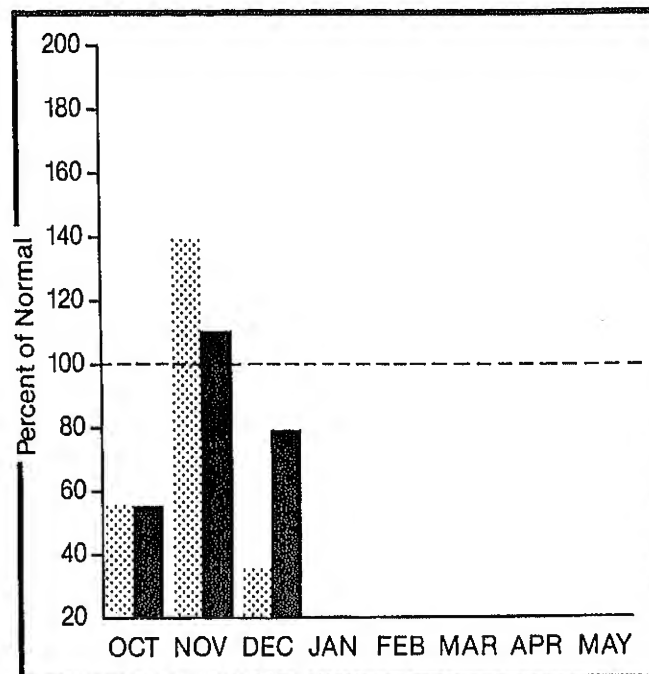
Minimum



Current



Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation



Year to date precipitation



## SPOKANE RIVER BASIN

### WATER SUPPLY OUTLOOK:

Spokane River's forecasted spring and summer runoff is 88% of normal. This forecast is based upon a snowpack that is 89% of average and a water year to date precipitation value of 79% of normal. Data for snow cover was obtained from SNOTEL sites with no manual measurements made for the January 1 period. December streamflow in the Spokane River was 76% of normal. Storage in Coeur d'Alene Lake was 134,200 acre feet compared to 184,200 last year, average storage in Cd'A for January 1 is 207,700 ac. ft.

For more information contact your local Soil Conservation Service office.

# STREAMFLOW FORECASTS

FORECAST	FCST	25YR	IMOST	MOST	IRMX	RMX	RMN	RMN
	PERIOD	AVG	IPROB	PROB	IKAF	% I	IKAF	
SPOKANE at Post Falls	APR-SEP	2848	2480	87.	3932	138	1028	36.
	APR-JUL	2754	2400	87.	3805	138	995	36.

- 1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.  
 2 - Corrected for upstream diversions or changes in reservoir storage. The average is computed for the 1961-85 base period.

## RESERVOIR STORAGE (1000AF)

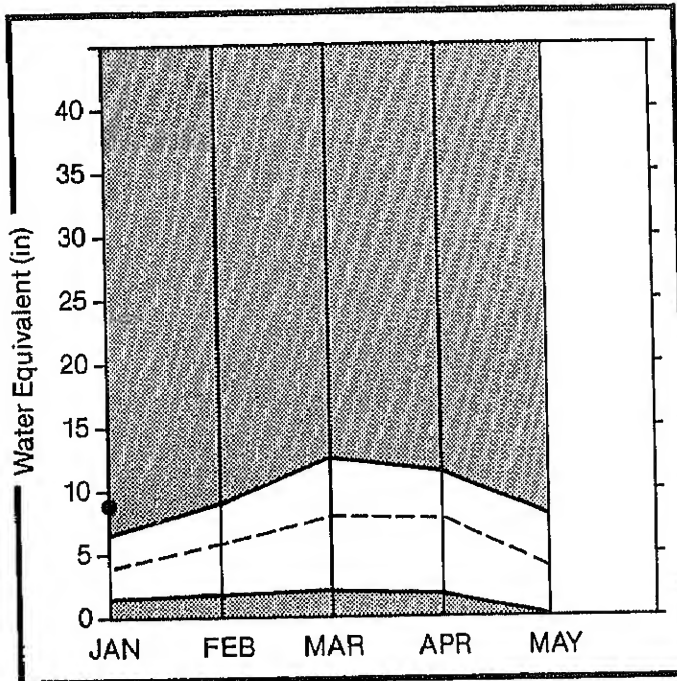
RESERVOIR	USABLE CAPACITY	** USABLE STORAGE **		
		THIS YEAR	LAST YEAR	AVE.
COEUR D'ALENE	291.2	134.2	91.7	205.4

## WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF	
		LAST YR.	AVERAGE
Spokane River	13	121	84

# COLVILLE AND PEND OREILLE

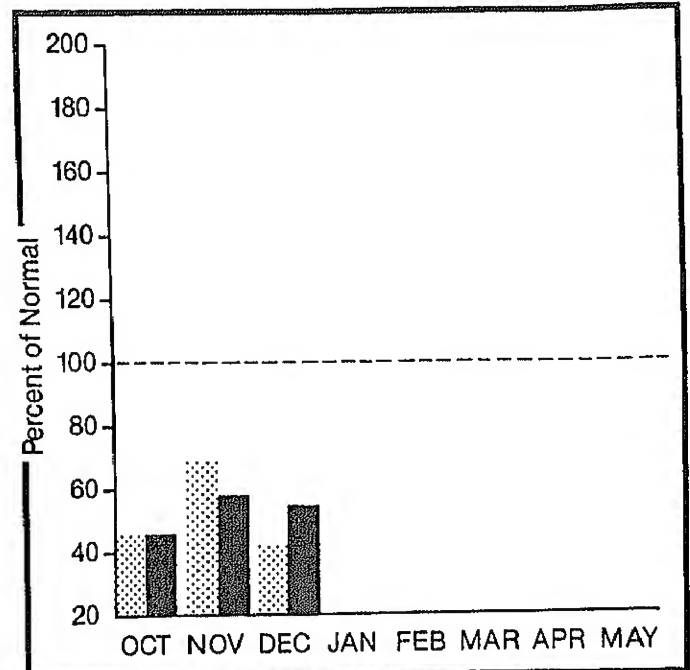
Mountain snowpack\* (inches)





\*Based on selected stations

Maximum  Average   
Minimum  Current 

Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation  Year to date precipitation 

## COLVILLE - PEND OREILLE RIVER BASINS

### WATER SUPPLY OUTLOOK:

Forecasted streamflows for the Pend Oreille River is 84%, Kettle River 84% and the Colville River 82% of normal for the spring and summer runoff period. Streamflows for December were 75% of average on the Pend Oreille River, 72% on the Kettle River and 86% on the Columbia River at the international Boundary. Snowpack measurements in the Pend Oreille Basin are at 89% of normal based mainly on SNOTEL measurements. Manual measurements of snow will begin February 1. Precipitation during December was 41% of average and water year to date values are 54% of normal.

For more information contact your local Soil Conservation Service office.

# STREAMFLOW FORECASTS

FORECAST	FCST	25YR	1MOST	MOST	IRMX	RMX	IRMN	RMN
	PERIOD	AVG	IPROB	PROB1	% 1	%		%
		KAF	1KAF	ZAVG	1KAF	AVG	1KAF	AVG
PEND OREILLE RIVER bl Box Canyon	APR-SEP	15425	13000	84.	17011	110	8990	58.
	APR-JUL	14156	12000	85.	15681	111	8319	59.
	APR-JUN	12227	10000	82.	13179	108	6821	56.
COLVILLE RIVER at Kettle Falls	APR-SEP	134	110	82.	177	132	43	32.
	APR-JUL	123	100	81.	162	132	39	32.
	APR-JUN	114	90	79.	147	129	33	29.
KETTLE RIVER nr Laurier	APR-SEP	1829	1540	84.	2363	129	717	39.
	APR-JUL	1738	1460	84.	2242	129	678	39.
	APR-JUN	1581	1260	80.	1971	125	549	35.
COLUMBIA RIVER at Birchbank 2	APR-SEP	44605	40300	90.	50113	112	30487	68.
	APR-JUL	35705	32200	90.	40055	112	24345	68.
	APR-JUN	26027	23500	90.	29226	112	17774	68.
COLUMBIA RIVER at Grand Coulee 2	APR-SEP	66841	58400	87.	73105	109	43695	65.
	APR-JUL	56169	48900	87.	61257	109	36543	65.
	APR-JUN	44036	38300	87.	47988	109	28612	65.

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## RESERVOIR STORAGE

(1000AF)

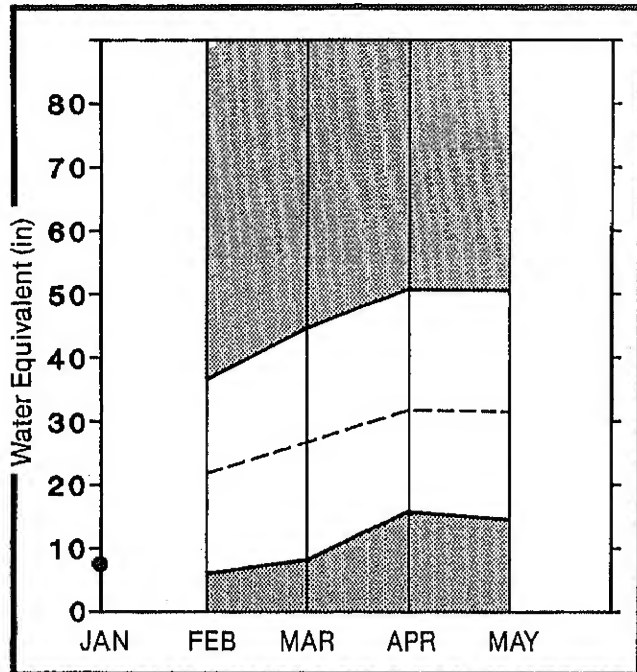
RESERVOIR	USABLE CAPACITY	** USABLE STORAGE **		
		THIS YEAR	LAST YEAR	AVE.
ROOSEVELT BANKS	5232.0	4617.5	3293.0	4547.9
	715.0	656.1	391.0	618.3

## WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D
Colville River	0
Pend Oreille River	9
Kettle River	2
Omac Lake, Twin Lakes	0
Newman Lake	1

# OKANOGAN AND METHOW

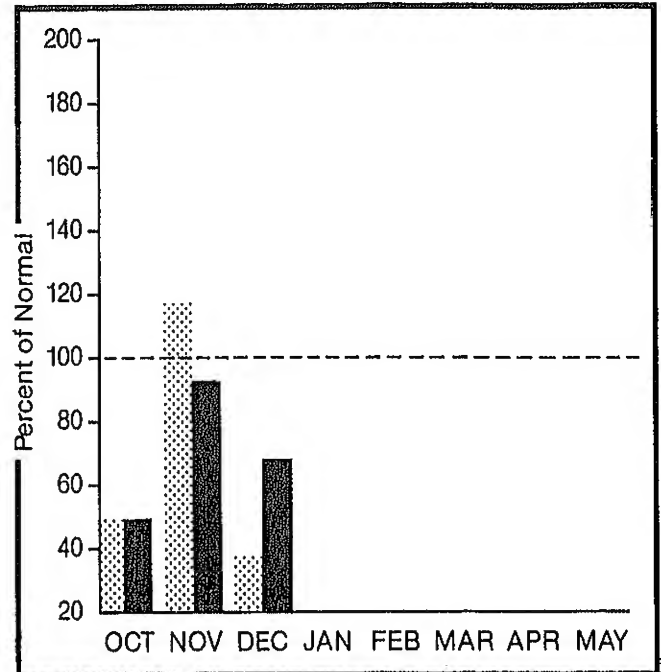
Mountain snowpack\* (inches)



\*Based on selected stations

Maximum Average Minimum Current

Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation Year to date precipitation

## OKANOGAN - METHOW RIVER BASINS

### WATER SUPPLY OUTLOOK:

Streamflow in the Okanogan River was at 101% of average for December. Forecasts for spring and summer on the Okanogan River are for runoff of 91% of normal and 90% on the Methow River. Snow cover as of January 1 is at 74%, based upon SNOTEL data. Manual snow surveys are scheduled for February 1. Precipitation in December was at 38% with water year to date 68% of average. Storage in the Conconully Reservoirs is at 13,400 acre feet which is 57% of capacity.

For more information contact your local Soil Conservation Service office.

# STREAMFLOW FORECASTS

FORECAST	FCST	25YR	IMOST	MOST	IRMX	RMX	IRMN	RMN
	PERIOD	AVG KAF	IPROB IKAF	PROB1 ZAVG	IKAF	% AVG	% IKAF	% AVG
SIMILKAMEEN R. nr Nighthawk	APR-SEP	1462	1390	95.	2443	167	337	23.
	APR-JUL	1365	1300	95.	2283	167	317	23.
	APR-JUN	1161	1100	95.	1936	167	264	23.
OKANOGAN R. nr Tonasket	APR-SEP	1644	1500	91.	2700	164	300	18.
	APR-JUL	1497	1360	91.	2453	164	267	18.
	APR-JUN	1262	1150	91.	2071	164	229	18.
METHOW RIVER nr Pateros	APR-SEP	980	880	90.	1213	124	547	56.
	APR-JUL	908	820	90.	1129	124	511	56.
	APR-JUN	773	700	91.	963	125	437	57.

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## RESERVOIR STORAGE

(1000AF)

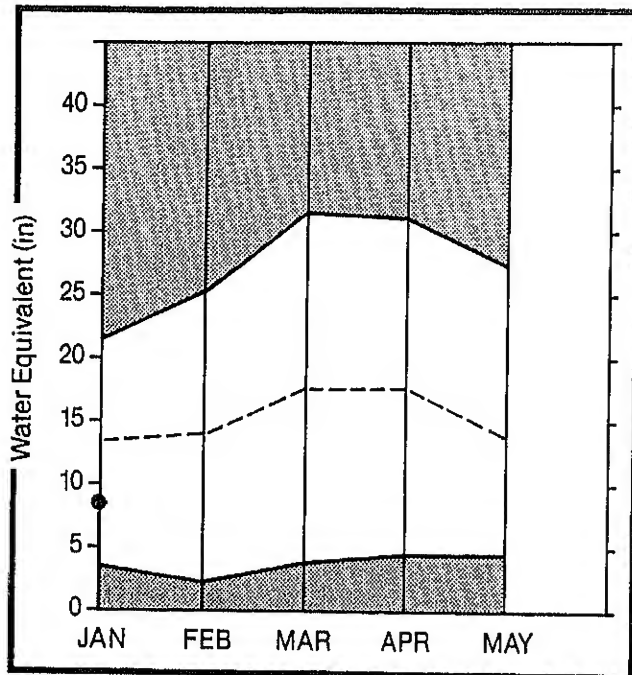
RESERVOIR	USABLE CAPACITY	** USABLE STORAGE **		
		THIS YEAR	LAST YEAR	AVE.
CONCONULLY LAKE (SALMON)	10.5	8.0	8.0	7.5
CONCONULLY RESERVOIR	13.0	5.0	5.6	5.9

## WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF	
		LAST YR.	AVERAGE
Okanogan River	17	102	78
Methow River	2	116	63

# WENATCHEE AND CHELAN

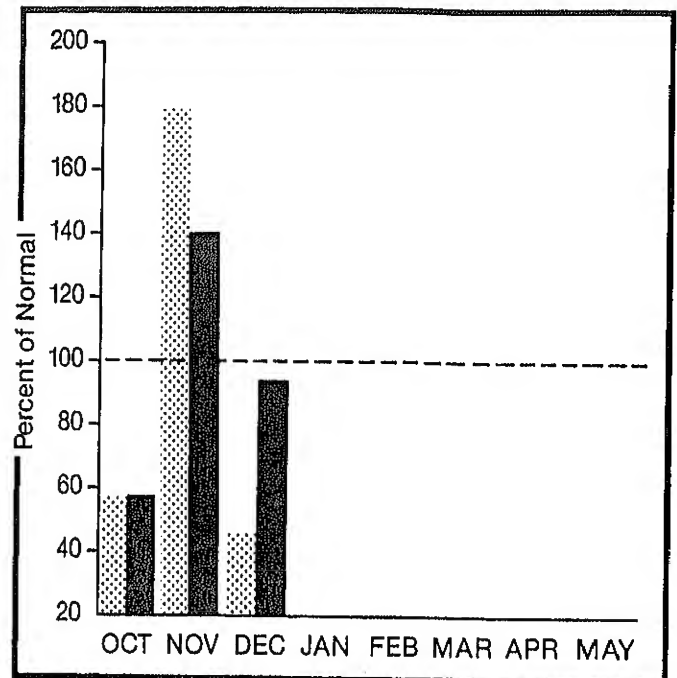
Mountain snowpack\* (inches)





\*Based on selected stations

Maximum  Average   
Minimum  Current 

Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation  Year to date precipitation 

## WENATCHEE - CHELAN RIVER BASINS

### WATER SUPPLY OUTLOOK:

Snowpack in the Wenatchee-Chelan Basin is at 86% of normal. Streamflows for December were 65% of average for the Chelan River and 70% on the Wenatchee River. Runoff for spring and summer is forecasted to be 90% of normal in the Wenatchee and 83% in the Chelan Basin. Stehekin River runoff is forecasted to be 85% of average. Precipitation during December was 46% in the Wenatchee and 46% in Chelan. Reservoir storage in Lake Chelan is at 365,000 acre feet or 96% of normal for January 1.

For more information contact your local Soil Conservation Service office.

# STREAMFLOW FORECASTS

FORECAST	FCST PERIOD	25YR AVG KAF	1MOST 1PROB 1KAF	MOST PROB ZAVG	1RMX KAF	RMX 1RMN Z AVG	1RMN KAF	RMN Z AVG
CHELAN RIVER at Chelan 1	APR-SEP	1203	1000	83	1349	112	651	54.
	APR-JUL	1055	880	83	1186	112	574	54.
	APR-JUN	826	660	80	900	109	420	51.
STEHEKIN R. at Stehekin	APR-SEP	840	730	85	945	110	515	60.
	APR-JUL	727	620	85	802	110	438	60.
	APR-JUN	553	470	85	608	110	332	60.
ENTIAT RIVER nr Ardenvoir	APR-SEP	235	175	75	234	100	116	49.
	APR-JUL	213	160	75	213	100	107	50.
	APR-JUN	172	130	76	173	101	87	51.
WENATCHEE RIVER at Plain	APR-SEP	1270	1140	90	1597	126	683	54.
	APR-JUL	1113	1000	90	1401	126	599	54.
	APR-JUN	899	800	89	1124	125	476	53.
STEMILT nr Wenatchee (miners in)	MAY-SEP	138	110	80	160	116	60	43.
ICICLE CREEK nr Leavenworth	APR-SEP	370	330	89	463	125	197	53.
	APR-JUL	340	300	88	422	124	178	52.
	APR-JUN	270	240	89	337	125	143	53.
COLUMBIA R. bl Rock Island Dam 2	APR-SEP	72781	64300	88	81767	112	46833	64.
	APR-JUL	61601	54200	88	68984	112	39416	64.
	APR-JUN	48384	42600	88	54212	112	30988	64.

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.

2 - Corrected for upstream diversions or changes in reservoir storage. The average is computed for the 1961-85 base period.

## RESERVOIR STORAGE

(1000AF)

RESERVOIR	USABLE CAPACITY	** USABLE STORAGE **		
		THIS YEAR	LAST YEAR	AVE.
CHELAN LAKE	676.1	865.0	865.7	878.7

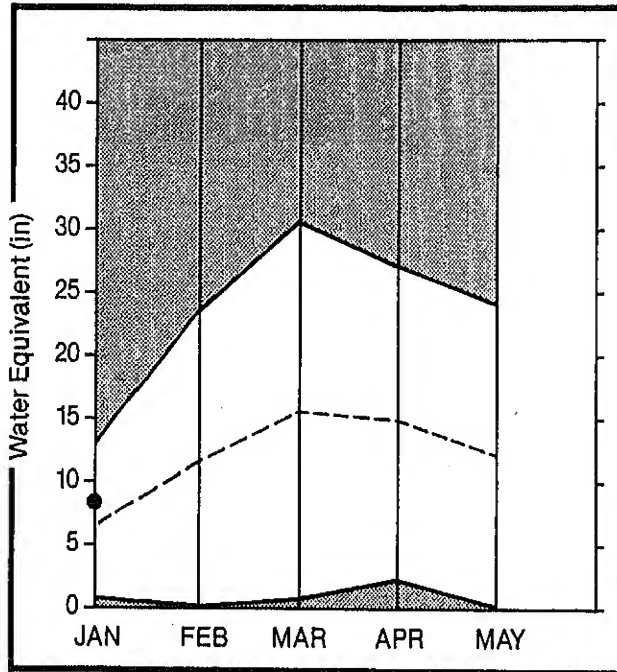
## WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF LAST YR. AVERAGE	
Chelan Lake Basin	4	143	97
Entiat River	0	0	0
Wenatchee River	6	117	84
Colockum Creek	1	44	69
Squilchuck Creek	0	0	0
Stemilt Creek	0	0	0



# YAKIMA

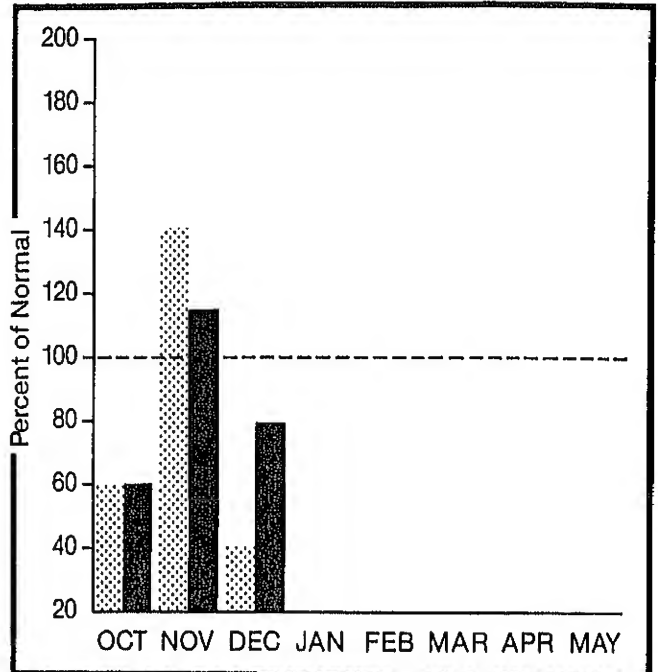
Mountain snowpack\* (inches)



\*Based on selected stations

Maximum Average Minimum Current

Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation Year to date precipitation

## YAKIMA RIVER BASIN

### WATER SUPPLY OUTLOOK:

Reservoir storage continues low, with January 1 values for the five major reservoirs at 337,900 acre feet or 58% of normal. December streamflow was not available due to icing of the stream gage.

Forecasts for the Yakima Basin runoff are 84% of normal, and for the Yakima River at Cle Elum 84%, Naches River 85%, the Yakima River at Parker 84% and Ahtanum Creek 83%. Snowpack is 84% of average in the Yakima basin. Precipitation for December was 40% of normal and 79% for the water year to date.

For more information contact your local Soil Conservation Service office.

# STREAMFLOW FORECASTS

FORECAST	FCST	25YR	IMOST	HOST	IRMX	RMX	IRMN	RMN
	PERIOD	AVG KAF	IPROB IKAF	PROB1 ZAVG1KAF		% I AVG1KAF		% AVG
YAKIMA RIVER at Martin 1	APR-SEP 139		120	86.	158	114	82	59.
	APR-JUL 128		110	86.	136	106	84	66.
	APR-JUN 111		95	86.	114	103	76	68.
YAKIMA RIVER at Cle Elum 2	APR-SEP 943		790	84.	941	100	639	68.
	APR-JUL 854		710	83	847	99.	573	67.
	APR-JUN 734		620	84.	737	100	503	69.
YAKIMA RIVER nr Parker 2	APR-SEP 2096		1740	84.	2326	111	1194	57.
	APR-JUL 1898		1590	84.	2102	111	1078	57.
	APR-JUN 1667		1400	84.	1850	111	950	57.
KACHESS RIVER nr Easton 1	APR-SEP 121		100	83.	139	115	61	50.
	APR-JUL 115		95	83.	132	115	58	50.
	APR-JUN 101		85	84.	117	116	53	52.
CLE ELUM RIVER nr Roslyn 1	APR-SEP 463		410	89.	516	111	304	66.
	APR-JUL 422		370	88.	450	107	290	69.
	APR-JUN 353		300	85.	367	104	233	66.
BUMPING RIVER nr Nile 1	APR-SEP 142		130	92.	171	120	89	63.
	APR-JUL 129		120	93.	157	122	83	64.
	APR-JUN 107		98	92.	129	121	67	63.
AMERICAN RIVER nr Nile	APR-SEP 124		110	89.	147	119	73	59.
	APR-JUL 113		100	88.	134	119	66	58.
	APR-JUN 94		83	88.	111	118	55	59.
TIETON RIVER at Tieton 1	APR-SEP 246		200	81.	249	101	151	61.
	APR-JUL 207		170	82.	211	102	129	62.
	APR-JUN 165		140	85.	173	105	107	65.
NACHES RIVER nr Naches 2	APR-SEP 867		740	85	1017	117	463	53.
	APR-JUL 784		670	88.	921	117	419	53.
	APR-JUN 667		570	85.	783	117	357	54.
AHTANUM CREEK nr Tampico 2	APR-SEP 47		39	83.	60	128	18.0	38.
	APR-JUL 43		36	84.	55	128	17.0	40.
	APR-JUN 37		31	84.	48	130	14.0	38.

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.  
 2 - Corrected for upstream diversions or changes in reservoir storage. The average is computed for the 1961-83 base period.

## RESERVOIR STORAGE (1000AF)

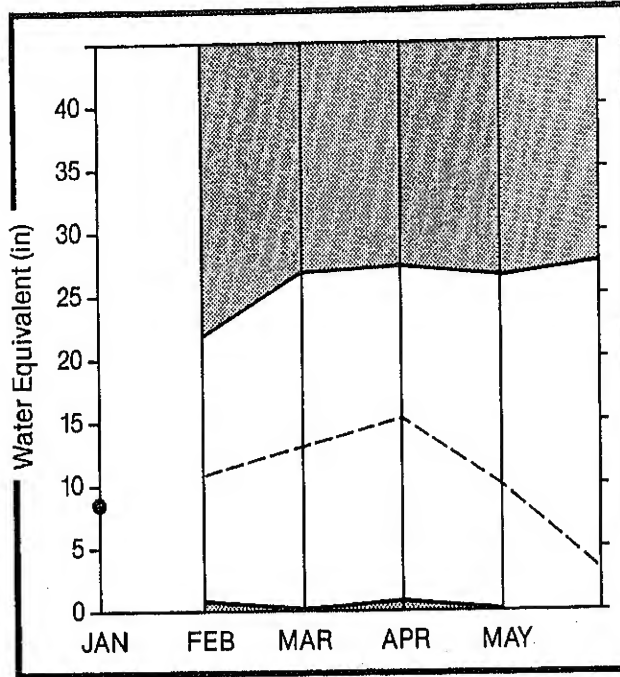
RESERVOIR	USABLE CAPACITY	** USABLE STORAGE **		
		THIS YEAR	LAST YEAR	AVE.
KEEACHELUS	157.8	64.2	59.2	83.0
KACHESS	239.0	55.5	98.1	159.1
CLE ELEM	436.9	102.2	118.5	290.2
BUMPING LAKE	33.7	12.4	7.3	6.8
RIMROCK	198.0	103.6	118.8	102.1

## WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF	
		LAST YR.	AVERAGE
Yakima River	14	110	83
Ahtanum Creek	2	58	42

# WALLA WALLA

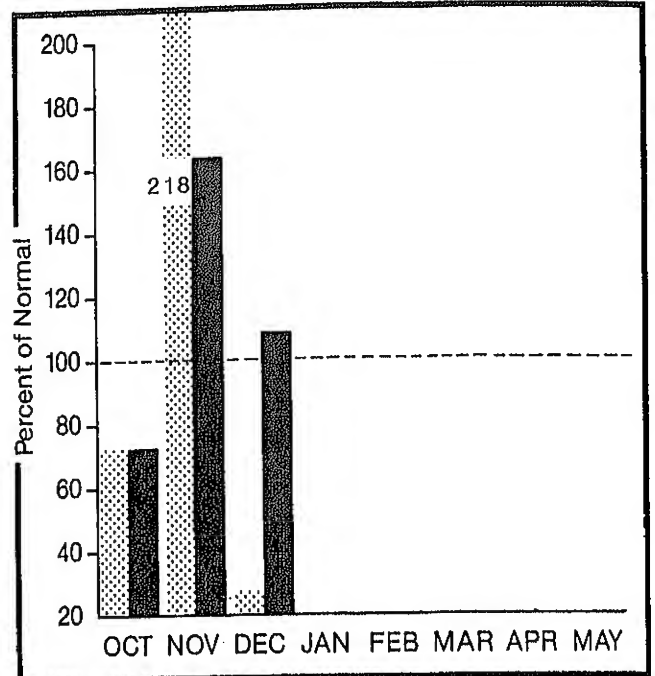
Mountain snowpack\* (inches)





\*Based on selected stations

Maximum  Average   
Minimum  Current 

Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation  Year to date precipitation 

## WALLA WALLA RIVER BASIN

### WATER SUPPLY OUTLOOK:

Snowpack in the Walla Walla River basin is 84% of normal. Precipitation for December was 28% of average and the water year to date precipitation has been 109% of normal. Forecasted streamflow in the Walla Walla Basin is 91% of average. Streamflow for December in the Walla Walla River was 49% of normal.

# STREAMFLOW FORECASTS

FORECAST	FCST PERIOD	25YR AVG KAF	1MOST IPROB IKAF	MOST PROB %AVG	I RMX KAF	I RMN %	I RMN %	I RMN %
MILL CREEK at Walla Walla	APR-SEP	17.5	16.0	91.	22	126	10.0	57.
	APR-JUL	17.3	15.7	91.	22	127	10.0	58.
	APR-JUN	17.2	15.6	91.	22	128	10.0	58.
COLUMBIA R. at The Dalles 2	APR-SEP	101000	84000	83.	110260	109	57740	57.
	APR-JUL	86500	71800	83.	94290	109	49310	57.
	APR-JUN	70100	58200	83.	76426	109	39974	57.

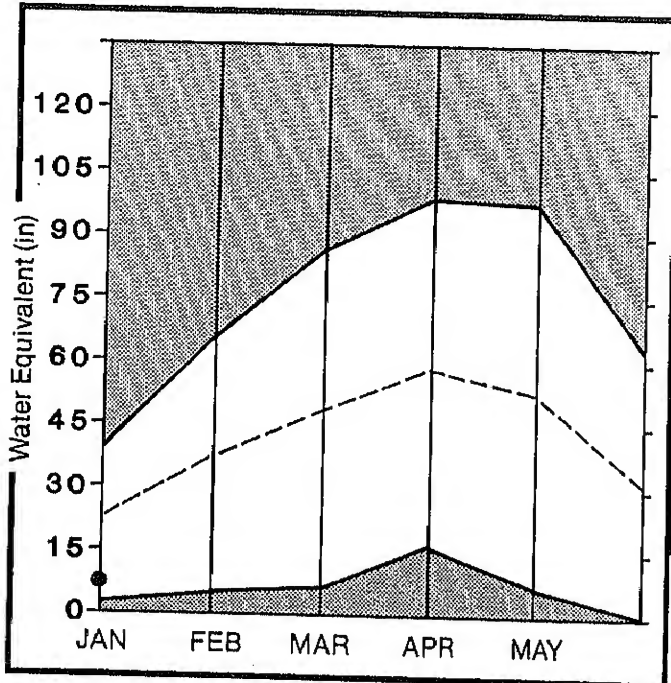
- 1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.  
 2 - Corrected for upstream diversions or changes in reservoir storage. The average is computed for the 1961-85 base period.

## WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF	
		LAST YR.	AVERAGE
Mill Creek	1	161	84

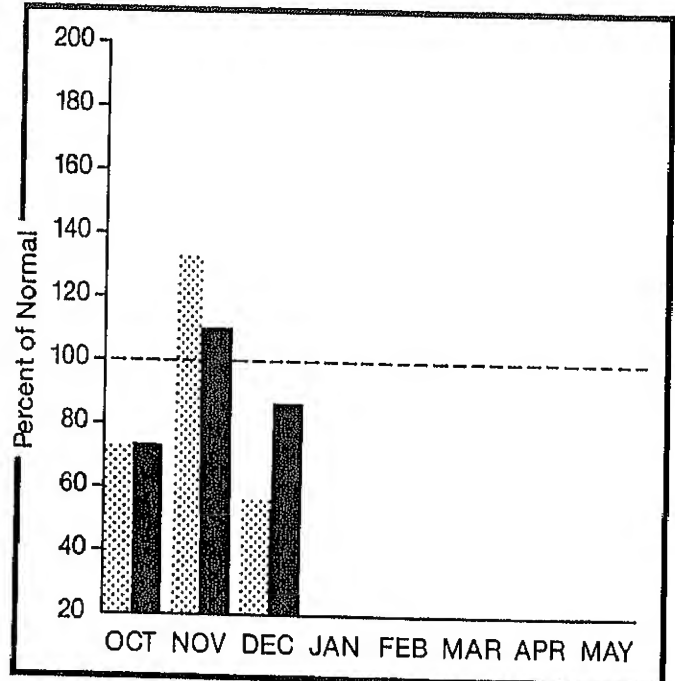
# COWLITZ AND LEWIS

Mountain snowpack\* (Inches)



\*Based on selected stations

Precipitation\* (percent of normal)



\*Based on selected stations

Maximum Average Minimum Current

Monthly precipitation Year to date precipitation

## COWLITZ - LEWIS RIVER BASINS

### WATER SUPPLY OUTLOOK:

Snow cover for the Cowlitz-Lewis Basin is at 77% of normal. This compares to last years 63% at this time. Maximum water content was noted at the Paradise SNOTEL site where the snow pack contained 23.7 inches of water on January 1. Streamflow is forecasted to be near normal for the coming water year. Forecasts for the Lewis River is 88% and for the Cowlitz River 88%. Precipitation was 56% of normal for December. Water year to date precipitation has been 86% of average.

# STREAMFLOW FORECASTS

FORECAST	FCST PERIOD	25YR AVG KAF	MOST IPROB 1KAF	MOST PROB1 %AUG1KAF	TIRM X	RMX %1 AVG1KAF	RMN %1 AVG1KAF	RMN % AVG
LEWIS RIVER at Ariel 2	APR-SEP	1249	1100	88.	1625	130	575	46.
	APR-JUL	1086	940	88.	1416	130	504	46.
	APR-JUN	961	850	88.	1254	130	446	46.
COWLITZ R. bl Mayfield Dam 2	APR-SEP	2038	1790	88.	2707	133	873	43.
	APR-JUL	1778	1560	88.	2360	133	760	43.
	APR-JUN	1502	1320	88.	1996	133	644	43.
COWLITZ R. at Castle Rock 2	APR-SEP	2673	2350	88.	3018	113	1682	63.
	APR-JUL	2323	2100	90.	2681	115	1519	65.
	APR-JUN	1980	1750	88.	2245	113	1255	63.

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.

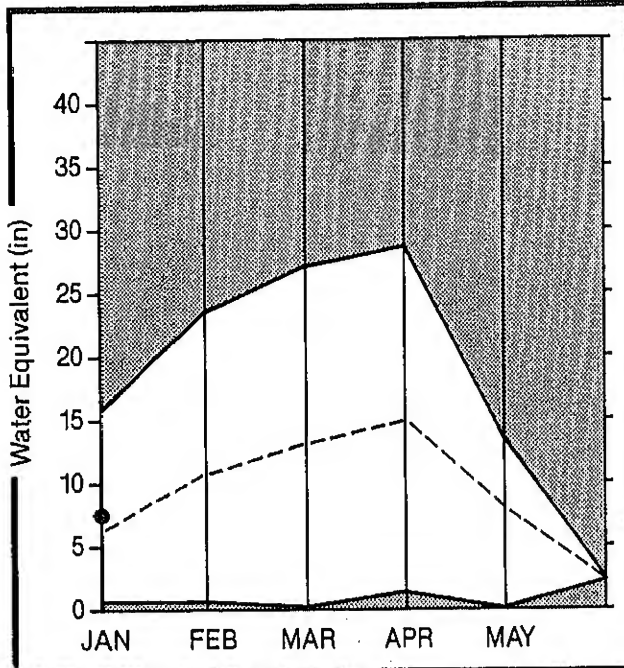
2 - Corrected for upstream diversions or changes in reservoir storage. The average is computed for the 1961-85 base period.

## WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF	
		LAST YR.	AVERAGE
Cowlitz River	1	93	68
Lewis River	4	92	78

# WHITE - GREEN

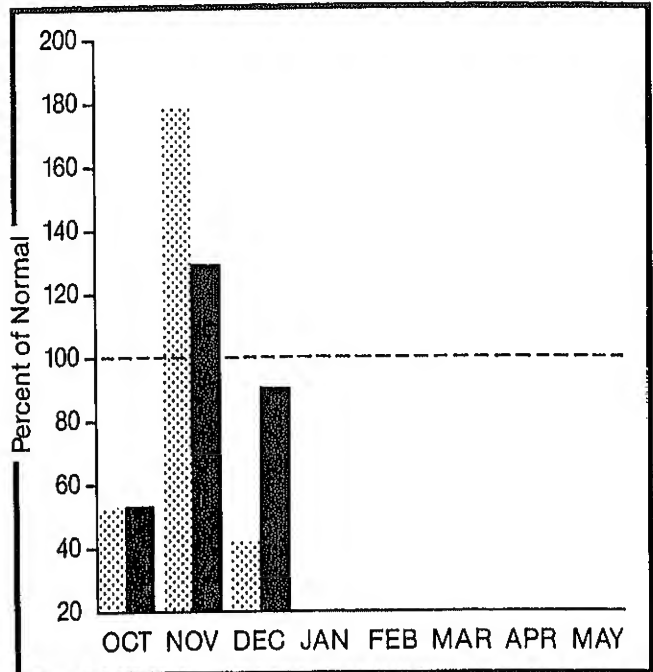
Mountain snowpack\* (inches)



\*Based on selected stations

Maximum Average Minimum Current

Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation Year to date precipitation

## WHITE - GREEN RIVER BASINS

### WATER SUPPLY OUTLOOK:

Summer runoff is forecasted to be 82% of normal on the Green River and 86% on the Cedar River. Water content at the Stampede Pass SNOTEL site showed 21.1 inches of water content on January 1. December runoff was near 60% of average. Precipitation was 41% of normal for December, bringing the water year to date to 91% of average. Snowpack is 74% of normal for the basin.

# STREAMFLOW FORECASTS

FORECAST	FCST	25YR	IMOST	MOST	IRMX	RMX	IRMN	RMN
	PERIOD	AVG KAF	IPROB IKAF	PROB %AVG IKAF		% AVG IKAF	% IKAF	% AVG
GREEN RIVER bl Howard Hanson Dam 2	APR-SEP	316	260	82.	371	117	149	47.
	APR-JUL	284	240	85.	339	119	141	50.
	APR-JUN	256	210	82.	300	117	120	47.
CEDAR RIVER nr Cedar Falls	APR-SEP	93	80	86.	113	122	47	51.

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.

2 - Corrected for upstream diversions or changes in reservoir storage. The average is computed for the 1961-85 base period.

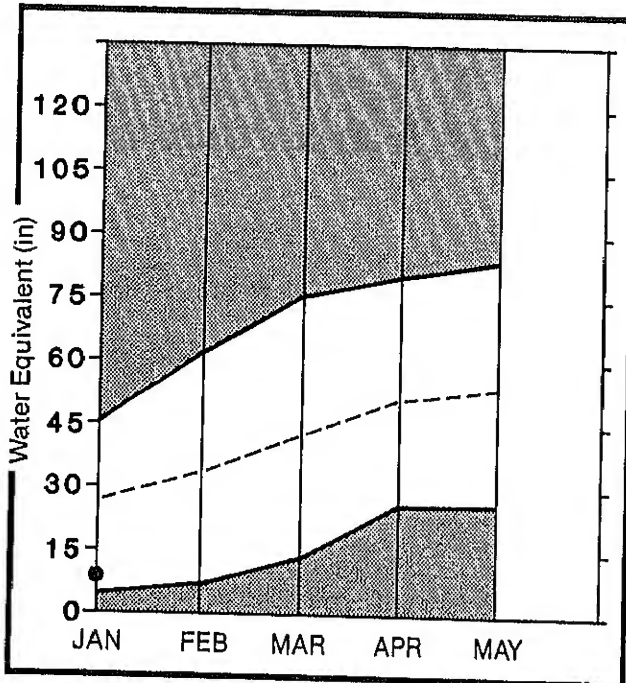
## WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF	
		LAST YR.	AVERAGE
White River	2	150	116
Green River	7	122	86



# NORTH PUGET SOUND

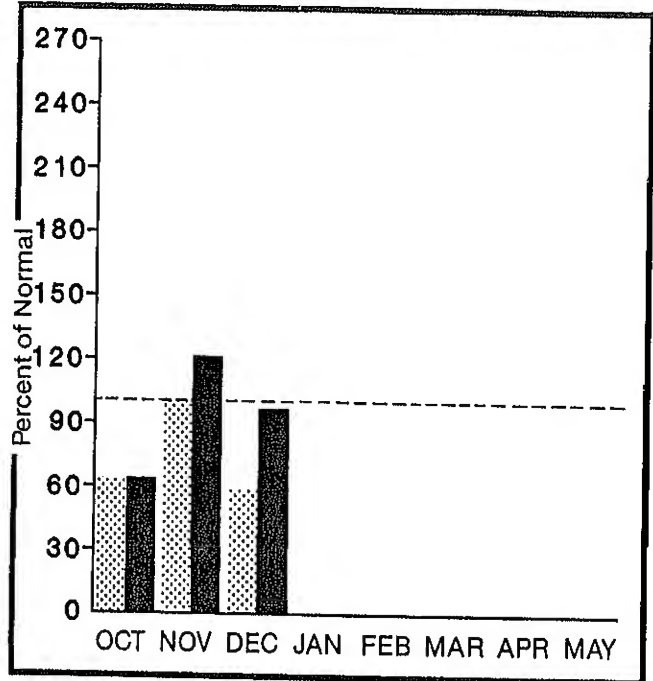
Mountain snowpack\* (inches)




\*Based on selected stations

Maximum  Average   
Minimum  Current 

Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation  Year to date precipitation 

## NORTH PUGET SOUND RIVER BASINS

### WATER SUPPLY OUTLOOK:

Snow cover for the North Puget Basin is 71% of normal, with the Harts Pass SNOTEL site having 19.1 inches of water content as of January 1. Precipitation values for December were 58% of average, with a water year to date at 95%. Forecasted runoff for the Skagit River is 94% of normal. Reservoir storage is below average with Ross storing 1,178,700 acre feet as of January 1, compared to last years 1,206,000 acre feet.

For more information contact your local Soil Conservation Service office.

# STREAMFLOW FORECASTS

FORECAST	FCST PERIOD	25YR AVG KAF	MOST IPROB IKAF	MOST PROB1 %AUGIKAF	RMXIRMN % I AUGIKAF	RMN % AVG
SKAGIT RIVER at Newhalem 2	APR-SEP	2356	2210	94.	2823	120 1597 68.
	APR-JUL	1972	1850	94.	2363	120 1337 68.
	APR-JUN	1485	1400	94.	1786	120 1014 68.

- 1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
- 2 - Corrected for upstream diversions or changes in reservoir storage. The average is computed for the 1961-85 base period.

## RESERVOIR STORAGE (1000AF)

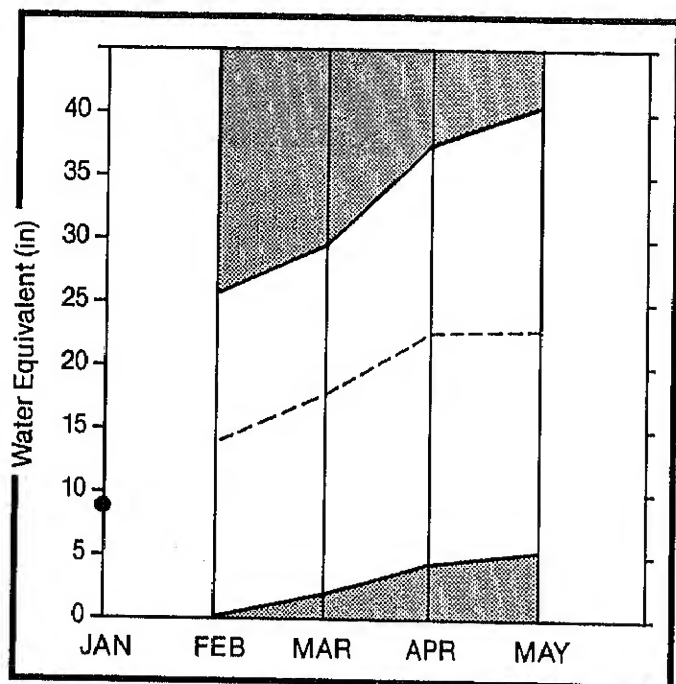
RESERVOIR	USABLE CAPACITY	** USABLE STORAGE **		
		THIS YEAR	LAST YEAR	AVE.
ROSS	1404.1	1178.7	1096.0	789.9
DIABLO RESERVOIR	90.6	89.6	84.8	---
GORGE RESERVOIR	9.8	8.0	7.6	---

## WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF	
		LAST YR.	AVERAGE
Skagit River	3	101	78
Baker River	0	0	0
Cedar River	0	0	0
Snoqualmie River	0	0	0
Skykomish River	2	128	88

# OLYMPIC

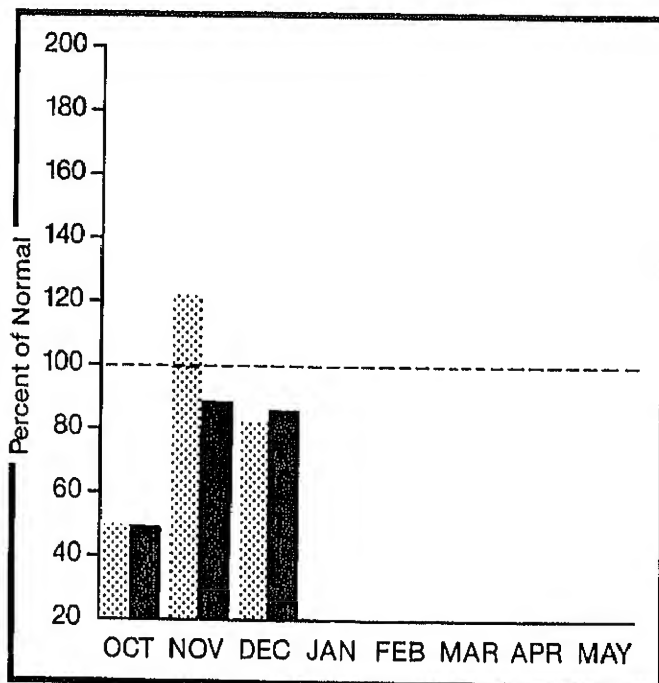
Mountain snowpack\* (inches)



\*Based on selected stations

Maximum Average Minimum Current

Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation Year to date precipitation

## OLYMPIC PENINSULA RIVER BASINS

### WATER SUPPLY OUTLOOK:

December precipitation was 82% of normal. The water year to date accumulation is 86% of average. Snow cover is estimated to be 90% of normal based upon snow pillow data from Carrol Pass on the Wynoochee River. Area streamflow was below normal during December. Forecasts of runoff for the Dungeness River is 90% of average and on the Elwha River 90%.

# STREAMFLOW FORECASTS

FORECAST	FCST	25YR	IMOST	MOST	IRMX	RMX	IRMN	RMN
	PERIOD	AVG KAF	IPROB IKAF	PROB1 ZAVG IKAF		% AVG IKAF	% IKAF	% AVG
DUNGENESS RIVER nr Sequim	APR-SEP	160	144	90.	176	110	112	70.
	APR-JUL	130	117	90.	143	110	91	70.
	APR-JUN	97	87	90.	106	109	68	70.
ELWHA RIVER nr Port Angeles	APR-SEP	553	500	90.	611	110	389	70.
	APR-JUL	454	410	90.	501	110	319	70.

- 1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.  
 2 - Corrected for upstream diversions or changes in reservoir storage. The average is computed for the 1961-85 base period.

## WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF	
		LAST YR.	AVERAGE
Dungeness River	0	0	0
Morse Creek	0	0	0
Elwha River	0	0	0

DATA CURRENT AS OF: 1/ 9/87 11:58:148

BASIN SUMMARY OF  
SNOW COURSE DATA

JANUARY 1987

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85
PEND OREILLE RIVER						
PENTON MEADOW	2370	12/30/86	6	1.2	2.2	3.0
PENTON SPRING	4920	12/30/86	26	6.4	5.1	8.6
HEART LAKE TRAIL	4800	12/28/87	27	6.7	6.9	9.2
HOOODOO BASIN	6050	12/28/86	56	17.8	16.7	21.5
HOOODOO CREEK	5900	12/28/86	48	14.6	12.6	19.1
LOOKOUT	5140	1/05/87	50	13.6	10.5	14.5
NELSON	3100	1/07/87	35	8.3	4.4	7.2
SCHWEITZER BOWL	4800	12/29/86	39	10.4	6.8	13.8
SCHWEITZER RIDGE	6200	12/29/86	52	17.9	15.7	21.3
COLVILLE RIVER						
KETTLE RIVER						
BIG WHITE MTH	5510	12/30/86	31	5.9	7.3	7.2
FARRON	4000	12/30/86	22	3.5	5.6	9.9
OMAK LAKE, TWIN LAKES						
SPDKANE RIVER						
ABOVE BURKE	4100	1/05/87	34	8.0	5.6	8.4
LOOKOUT	5140	1/05/87	50	13.6	10.5	14.5
LOST LAKE	4110	12/31/86	65	20.2	17.2	25.2
MOSQUITO RIDGE	5200	1/01/87	---	12.5E	---	17.1
SHERWIN	3200	1/02/87	19	3.7	3.9	5.6
SUNSET	5540	1/01/87	---	12.1E	---	14.7
NEWMAN LAKE						
RAGGED RIDGE	3330	12/30/86	13	2.6	4.8	3.9
SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85
OKANOGAN RIVER						
BLACKHALL PEAK	CAN. 6370	12/30/86	54	17.0	11.6	14.8
BRENDA MINE	CAN. 4800	12/29/86	23	5.2	4.2	6.5
BROOKHIRE	CAN. 3200	1/01/87	22	5.7	4.9	4.6
ENDERBY	CAN. 6200	12/30/86	67	17.5	19.7	18.6
GREYBACK RES	CAN. 5120	12/30/86	17	3.0	4.4	3.1
HAMILTON HILL	CAN. 4890	12/29/86	24	4.2	4.7	8.4
HARTS PASS	FILLON 6500	1/01/87	---	19.15	15.4	27.2
ISINTOK LAKE	CAN. 5590	12/26/86	10	2.4	3.4	3.5
LOST HORSE MTH	CAN. 6300	12/31/86	17	3.8	3.5	4.7
MCCULLOCH	CAN. 4200	12/31/86	14	2.3	2.8	3.2
MISSION CREEK	CAN. 5800	12/30/86	29	6.5	9.7	8.9
MT. KOBAN	CAN. 5900	12/28/86	13	2.8	3.9	6.3
SALMON HDS	FILLON 4500	1/01/87	---	2.35	3.1	7.0
SILVER STAR MTH	CAN. 6000	12/28/86	30	10.5	13.2	13.4
SUMMERLAND RES	CAN. 4200	12/28/86	15	3.3	3.7	4.5
VASEUX CREEK	CAN. 4600	12/29/86	8	1.4	2.5	2.7
WHITE ROCKS MTH	CAN. 6000	12/30/86	33	9.3	6.9	11.6
METHOW RIVER						
HARTS PASS	FILLON 6500	1/01/87	---	19.15	15.4	27.2
SALMON HDS	FILLON 4500	1/01/87	---	2.35	3.1	7.0
CHELAN LAKE BASIN						
LYMAN LAKE	FILLON 5900	1/01/87	---	27.15	20.0	28.3
MIRROR LAKE	FILLON 5600	1/01/87	---	17.45	11.5	14.1
PARK CK RIDGE	FILLON 4600	1/01/87	---	24.45	15.8	20.6
RAINY PASS	FILLON 4780	1/01/87	---	14.95	11.2	23.2
ENTIAH RIVER						
WENATCHEE RIVER						
BERNE-HILL CREEK	3170	12/30/86	46	10.4	7.9	11.7
ELENETT PASS	FILLON 4270	1/01/87	---	5.95	9.1	11.5
LYMAN LAKE	FILLON 5900	1/01/87	---	27.15	20.0	28.3
MERRITT	2140	12/30/86	25	4.3	6.4	7.5
STEVENS PASS	FILLON 4670	1/01/87	---	20.05	15.5	18.9
STEVENS PASS SAND SD	3700	12/30/86	59	13.8	11.0	19.3
SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85

COLOCUM CREEK						
TROUGH #2	FILLON 5310	1/01/87	---	3.5E	7.9	5.1
SQUILCHUCK CREEK						
STENHILT CREEK						
YAKIMA RIVER						
ANTANUM R.S.	3100	12/29/86	14	2.6	6.4	3.6
SIS BOULDER CREEK	3200	12/31/86	34	6.6	5.7	7.2
ELENETT PASS	FILLON 4270	1/01/87	---	5.95	9.1	11.5
BUMFING LAKE	3450	12/29/86	22	3.8	5.2	6.5
BUMFING LAKE (NEW)	3400	12/29/86	27	4.8	5.8	8.0
CORRAL PASS	FILLON 6000	1/01/87	---	22.5E	13.7	15.5
FISH LAKE	FILLON 3370	1/01/87	---	12.95	8.6	15.1
GREEN LAKE	FILLON 6000	1/01/87	---	5.05	6.0	8.7
GROUSE CAMP	FILLON 5380	1/01/87	---	4.55	6.5	9.0
MORSE LAKE	FILLON 5400	1/01/87	---	21.15	15.3	22.0
STAMPEDE PASS	FILLON 3860	1/01/87	---	21.15	13.7	23.6
SASSE RIDGE	FILLON 4200	1/01/87	---	11.95	10.1	15.4
WHITE PASS ES	FILLON 4500	1/01/87	---	7.15	7.6	10.4
ANTANUM CREEK						
ANTANUM R.S.	3100	12/29/86	14	2.6	6.4	3.6
WHITE PASS ES	FILLON 4500	1/01/87	---	5.05	6.0	8.7
MILL CREEK						
HIGH RIDGE	FILLON 4980	1/01/87	---	10.35	6.4	12.2
LEWIS AND COHLITZ RIVERS						
WHITE PASS ES	FILLON 4500	1/01/87	---	7.15	7.6	10.4
SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85
WHITE RIVER						
CORRAL PASS	FILLON 6000	1/01/87	---	22.5E	13.7	15.5
MORSE LAKE	FILLON 5400	1/01/87	---	21.15	15.3	22.0
GREEN RIVER						
COUGAR MTH.	FILLON 3200	1/01/87	---	7.05	6.7	11.2
GRASS MOUNTAIN #2	2900	1/05/87	12	3.0	2.7	5.4
LESTER CREEK	3100	1/05/87	30	4.5	7.2	8.6
LYNN LAKE	4000	1/05/87	24	7.0	10.2	7.8
SAWHILL RIDGE	4700	1/05/87	48	14.9	7.1	14.1
STAMPEDE PASS	FILLON 3860	1/01/87	---	21.15	13.7	23.6
TWIN CAMP	4100	1/05/87	42	11.4	9.5	10.3
CEDAR RIVER						
SHOQUALMIE RIVER						
SKYKOMISH RIVER						
STEVENS PASS	FILLON 4070	1/01/87	---	20.05	15.5	18.9
STEVENS PASS SAND SD	3700	12/30/86	59	13.8	11.0	19.3
SHAGIT RIVER						
HARTS PASS	FILLON 6500	1/01/87	---	19.15	15.4	27.2
LYMAN LAKE	FILLON 5900	1/01/87	---	27.15	20.0	28.3
RAINY PASS	FILLON 4780	1/01/87	---	14.95	11.2	23.2
BAKER RIVER						
DUNGENESS RIVER						
SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85





## The Following Organizations Cooperate With The Soil Conservation Service In Snow Survey Work

- Canada:** Ministry of the Environment, Water  
Investigations Branch, Victoria, British Columbia
- States:** Washington State Department of Ecology  
Washington State Department of Natural Resources
- Federal:** Department of the Army  
Corps of Engineers  
U.S. Department of Agriculture  
Forest Service  
U.S. Department of Commerce  
NOAA, National Weather Service  
U.S. Department of the Interior  
Bonneville Power Administration  
Bureau of Reclamation  
Geological Survey  
National Park Service  
Bureau of Indian Affairs
- Local:** City of Tacoma  
City of Seattle  
Chelan County P.U.D.  
Pacific Power and Light Company  
Puget Sound Power and Light Company  
Washington Water Power Company  
Snohomish County P.U.D.  
Colville Confederated Tribes
- Private:** Okanogan Irrigation District  
Wenatchee Heights Irrigation District  
Newman Lake Homeowners Association

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.



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SOIL CONSERVATION SERVICE  
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